EXAR PRODUCT GUIDE

EXAR INTEGRATED SYSTEMS, INC.
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INTRODUCTION

Exar was formed as a joint venture in early 1971 by three American founders and a large component manufacturer in order to service the full-custom and semi-custom linear bipolar integrated circuit market. In addition to its custom IC capabilities, Exar offers a broad line of standard IC products specifically suited for the fields of telecommunications and industrial controls.

Experience

Exar's experience and expertise in the area of bipolar IC technology extends both into custom and standard IC products. In the area of custom IC's, Exar has designed, developed, and manufactured a wide range of full-custom monolithic circuits, particularly for applications in the areas of telecommunications, home entertainment electronics, and industrial controls.

In addition to the full-custom capability, Exar also offers a unique semi-custom IC design and development capability specifically intended for low-to-medium volume, special purpose custom circuits. This semi-custom design capability, designated the XR-Chip program, allows a customized monolithic IC to be developed with a turnaround time of several weeks at a small fraction of the cost of a full-custom development program.

In the field of standard linear-IC products, Exar has extended its circuit technological leadership into the areas of communications and control circuits. Today Exar has one of the most complete lines of monolithic timing circuits in the industry. Exar also manufactures a large family of telecommunications circuits such as compandors, tone encoders and decoders, modulators, repeaters, and phase-locked loops. In the field of industrial control circuits, Exar manufacturers radio-control and servo IC's, power-control circuits, dc-dc converters, and voltage regulators. Exar recently developed, and is producing, several designs of quad operational amplifiers, including one which is programmable.

New Technology

Through company-sponsored research and development activities, Exar has recently completed development efforts in Integrated Injection Logic (I^2L) technology, which offers unique advantages in the area of low-power, high-density logic arrays. Exar has a complete design engineering group dedicated to this new technology, and is currently supplying custom I^2L circuits.

TERMS AND CONDITIONS

- Minimum O.E.M. Order is 1000 Pieces Per Type
- Terms of Payment are Net 30 Days to Rated Firms
- Industry Standard Pack and Packaging Used Unless Otherwise Specified

PARTS LIST

COMMUNICATION CIRCUITS

XR-1488	QUAD LINE DRIVER
XR-S200	MULTIFUNCTION COMMUNICATION CIRCUIT
XR-1489A	QUAD LINE RECEIVER
XR-2208	FOUR-QUADRANT OPERATIONAL MULTIPLIER
XR-2216	MONOLITHIC COMPANDOR

PHASE-LOCKED LOOPS

XR-210	FSK MODULATOR/DEMODULATOR
XR-215	GENERAL PURPOSE PHASE-LOCKED LOOP
XR-2211	FSK DEMODULATOR/TONE DECODER

FUNCTION GENERATORS

XR-205	WAVEFORM GENERATOR
XR-2206	MONOLITHIC FUNCTION GENERATOR
XR-2207	CURRENT-CONTROLLED OSCILLATOR

TONE DECODERS

XR-567	TONE DECODER
XR-2567	DUAL TONE DECODER

VOLTAGE REGULATORS

XR-1468/ 1568	DUAL ±15 VOLT TRACKING REGULATOR
XR-4194	ADJUSTABLE DUAL TRACKING VOLTAGE REGULATOR
XR-4195	DUAL ±15V TRACKING VOLTAGE REGULATOR

OPERATIONAL AMPLIFIERS

XR3403	QUAD OPERATIONAL AMPLIFIER
XR-4136	QUAD OPERATIONAL AMPLIFIER
XR-4202	PROGRAMMABLE QUAD OPERATIONAL AMPLIFIER
XR-4212	QUAD OPERATIONAL AMPLIFIER
XR-4558	DUAL OPERATIONAL AMPLIFIER
XR-4739	DUAL LOW-NOISE OPERATIONAL AMPLIFIER

TIMING CIRCUITS

XR-320	TIMING CIRCUIT
XR-555	TIMING CIRCUIT
XR-556	DUAL 555 TIMING CIRCUIT
XR-2240	PROGRAMMABLE TIMING CIRCUIT
XR-2556	DUAL 555 TIMING CIRCUIT

INTERFACE CIRCUITS

XR-2200	HAMMER DRIVER
XR-2201/ 2202/2203/ 2204	HIGH VOLTAGE, HIGH CURRENT DARLINGTON TRANSISTOR ARRAYS
XR-2271	FLUORESCENT DISPLAY DRIVERS
XR-2272	HIGH VOLTAGE 7-DIGIT DISPLAY DRIVER

OTHER CIRCUITS

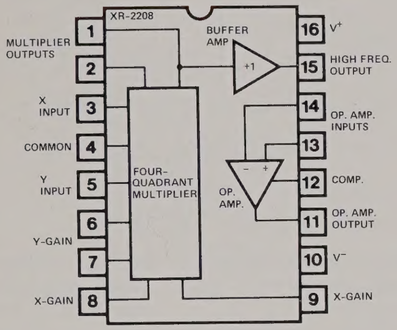
XR-742	ZERO CROSSING AC TRIGGER – TRIGAC
XR-1310	FM STEREO DEMODULATOR
XR-2264	PROPORTIONAL SERVO IC
XR-4151	VOLTAGE-TO-FREQUENCY CONVERTER

CUSTOM CIRCUITS

XR-I^2L	EXAR I^2L CUSTOM IC DESIGN KIT
XR-CHIP	EXAR CHIP CUSTOM IC DESIGN KIT

COMMUNICATION CIRCUITS

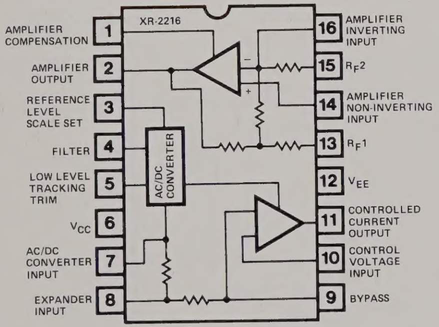
XR-2208



FOUR-QUADRANT OPERATIONAL MULTIPLIER

Independent Multiplier, Op Amp and Buffer Amp
Non-Linearity: 0.3%
Wide BW: 3 db – 8 MHz
3° Phase Shift – 1.2 MHz
Buffer Amp For Signal Processing
Op Amp For Analog Computation
Power Supply: ±4.5 to ±16
Precision PLL With XR-2207
Motor Speed Control

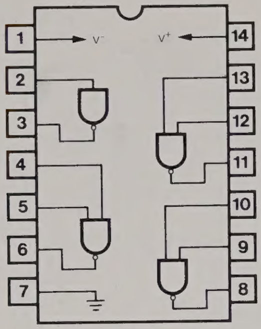
XR-2216



MONOLITHIC COMPANDOR

Compressor: output change 1 db for 2 db change at the input, 60 db dynamic range
Expandor: reverse of the compressor
300 to 3500 Hz range
Wide power supply range: 6 to 20V, single or split supplies
Low external component count
Excellent tracking of transfer function
Low noise and low distortion

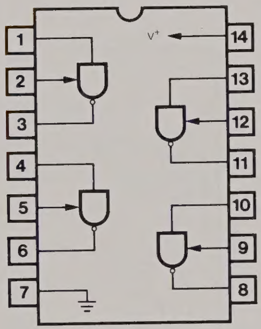
XR-1488



QUAD LINE DRIVER

Meets RS232C Driver Specifications
Interfaces Data Terminal and Data Communications Equipment
DTL/TTL Logic Inputs Are Converted to RS232 Output Levels
14 Pin DIP Package
Typical Supply Voltages: ±9V
Pin-for-Pin Replacement for MC1488, LM1488
Four Independent Drivers Per Package

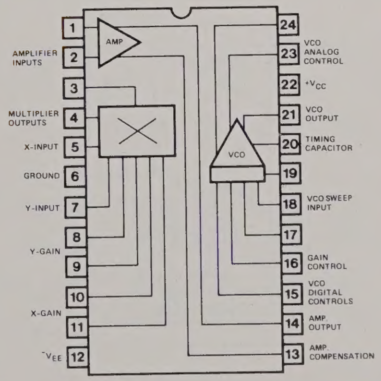
XR-1489A



QUAD LINE RECEIVER

Meets RS232C Receiver Specifications
Interface Data Terminal and Data Communications Equipment
Typical Hysteresis of 1.15 Volts
RS232 Input Levels Are Converted To DTL/TTL Outputs
Typical Supply Voltage: +5V
Programmable Threshold
Pin-for-Pin Replacement for MC1489A, LM1489A
Four Independent Receivers Per Package

XR-S200



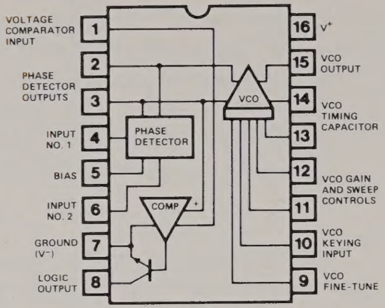
MULTIFUNCTION COMMUNICATION CIRCUIT

Package: 24 Pin
Independent Multiplier, VCO and Op Amp
VCO Frequency: 30 MHz
Multiplier 3 db BW: 6 MHz

APPLICATIONS:
Phase-Locked Loops
AM Detection
Waveform Generation
FM Demodulation

PHASE-LOCKED LOOPS

XR-210

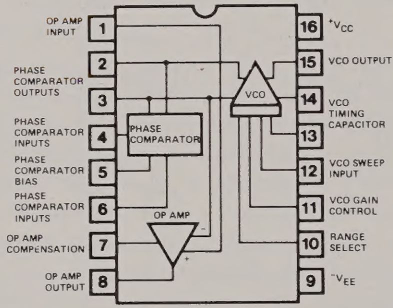


FSK MODULATOR/DEMODULATOR

Power Supply: 5 to 26 Volts
Frequency Range: 0.5 Hz to 20 MHz
RS-232C Demodulated Output
Independent "Mark" and "Space" Adjustment
DTL, TTL, ECL Logic Compatibility

APPLICATIONS:
FSK Demodulation (MODEM)
FSK Generation
Frequency Synthesis
Tracking Filter

XR-215

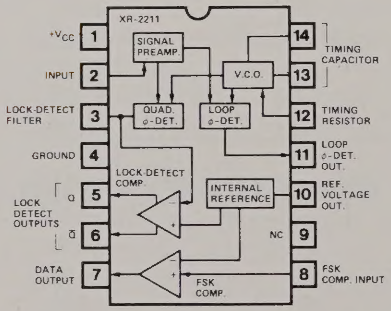


GENERAL PURPOSE PHASE-LOCKED LOOP

Frequency Range: 0.5 Hz to 35 MHz
Power Supply 5 to 26 Volts
300 μV to 3V Dynamic Range
DTL, TTL, ECL Logic Compatibility

FM Demodulation:
Distortion 0.15%
Signal/Noise 65 db
Frequency Synthesis

XR-2211

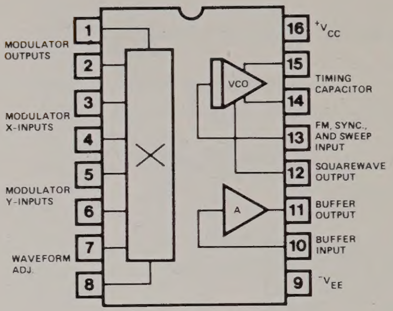


FSK DEMODULATOR/TONE DECODER

The XR-2211 is a monolithic phase-locked loop (PLL) system especially designed for data communications. It is particularly well suited for FSK modem applications. It operates over a wide supply voltage range of 4.5 to 24V and a wide frequency range of 0.01 Hz to 300 kHz. It can accommodate analog signals between 2 mV and 3V, and offers a temperature stability of 20 ppm/°V.

FUNCTION GENERATORS

XR-205

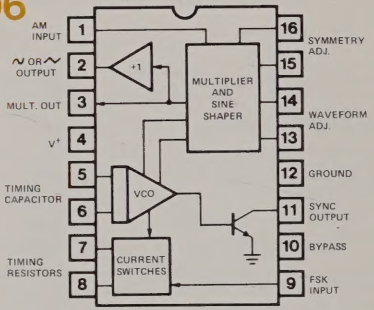


WAVEFORM GENERATOR

Waveform Generation: Sine, Square, Pulse, Triangle, Sawtooth
Frequency Sweep Range 7:1
Amplitude and Frequency Modulation of Waveforms

Package: 16 Pin Ceramic
Power Supply: 8 to 26 Volts
Sine Wave: 4 MHz, 2.5% THD
$3V_{p\text{-}p}$ Output

XR-2206

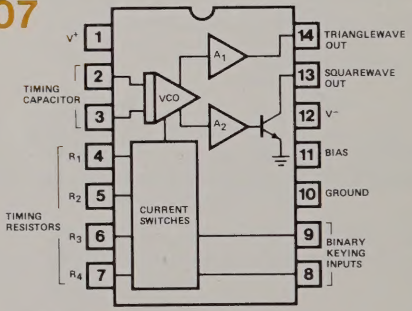


MONOLITHIC FUNCTION GENERATOR

Low (0.5%) Sinewave Distortion.
2 Simultaneous Outputs Provide Square, Triangle, Sine, Ramp, Pulse Waveforms.
Wide Sweep Range (2000:1 Typ).
Excellent Stability (20 ppm/°C).
FSK Control.
AM, FM Capability.

APPLICATIONS:
Waveform Generation
Sweep Generation
Stepper-Motor Drive
Voltage to Frequency Conversion
Tone Generation
AM, FM, FSK Generation

XR-2207



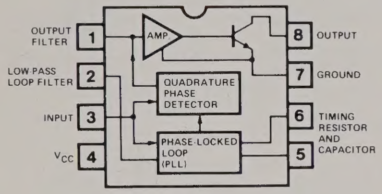
CURRENT-CONTROLLED OSCILLATOR

Simultaneous Triangle/Squarewave Outputs
Low Frequency Drift: 30 ppm/°C
Frequency Sweep Range: 1000:1
Frequency: 0.01 Hz to 1 MHz
Programmable for Four Discrete Frequencies

APPLICATIONS:
FSK Generation
MODEMS
FM
Sweep Generation
Precision Phase-Locked Loops
Replaces Crystal-Controlled Oscillators

TONE DECODERS

XR-567

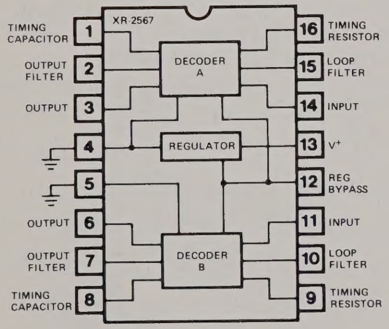


TONE DECODER

Frequency Range: 0.01 Hz to 500 kHz
Logic Compatible Output Can Sink 100 mA
Four External Components Determine BW, Center Frequency Output Delay

Power Supply: 4.75 to 9.0V
Package: 8 Pin DIP
Pin-for-Pin Replacement for SE567, LM567

XR-2567



DUAL TONE DECODER

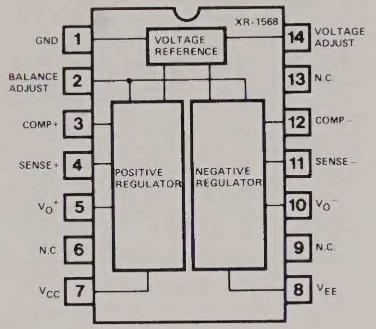
Replaces Two 567-Type Decoders
Temperature Matching Between Decoders
Independent Operation Between Decoders
Power Supplies: 4.5V to 12V
Internal Regulation for 7V to 12V Supplies

Frequency Range: 0.01 Hz to 500 kHz

APPLICATIONS:
Touch-Tone Decoding
Dual Tone Decoding
Sequential decoding

VOLTAGE REGULATORS

XR-1468/1568

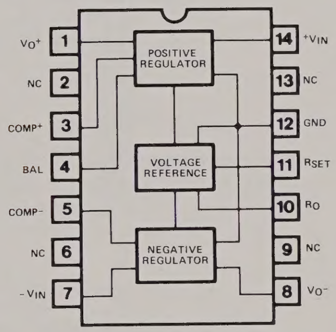


DUAL ±15 VOLT TRACKING REGULATOR

Provides Balanced ± Output Voltages at Currents to 100 mA
Outputs Balanced to Within 1%
Input Voltages up to ±30V
Standby Current Drain of 30 mA
Pin-for-Pin Replacement for MC1568/1468

Line & Load Regulation of 0.06%
Externally Adjustable Current Limit
14 Pin Dual-In-Line Package

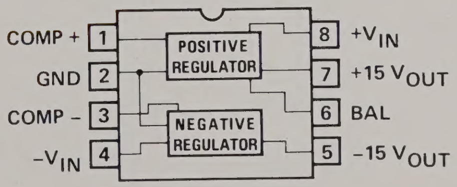
XR-4194



ADJUSTABLE DUAL TRACKING VOLTAGE REGULATOR

Direct Replacement for RC/RM4194
Both Outputs Adjust with Single Resistor
High Load Current (±200 mA)
3 Watt Power Dissipation

XR-4195

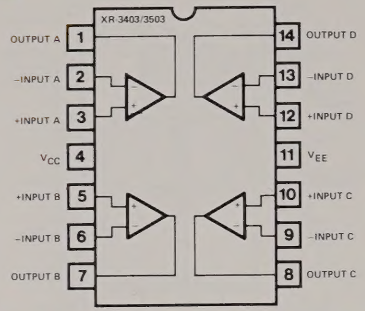


DUAL ±15V TRACKING VOLTAGE REGULATOR

Direct Replacement for RC/RM4195
Output Currents to 100 mA
Fixed ±15V Power Supply
Available in TO-66, TO-99 and 8-Pin Plastic

OPERATIONAL AMPLIFIERS

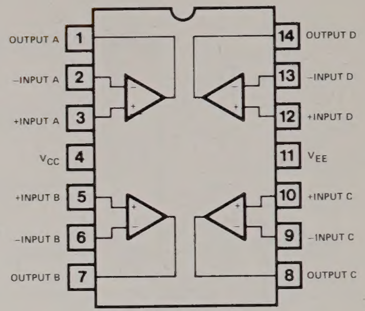
XR-3403



QUAD OPERATIONAL AMPLIFIER

Direct Replacement for MC3403/3503, LM324, and RM/RC4137
Minimum Crossover Distortion
Internal Frequency Compensation
No Latch-Up
Short Circuit Protection

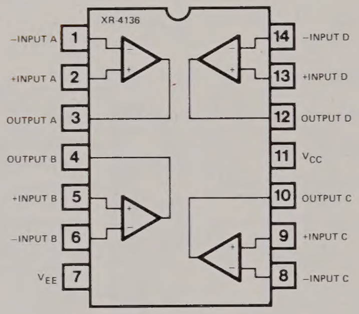
XR-4212



QUAD OPERATIONAL AMPLIFIER

Pin Compatible with MC3403, LM324 and HA4741
4136 Performance with 3403/324 Pinout
Low Power Consumption (50 mW typ/120 mW Max.)

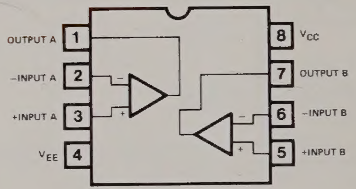
XR-4136



QUAD OPERATIONAL AMPLIFIER

Direct Replacement for RM/RC4136
Low Power Operation (50 mW typ)
Internal Frequency Compensation
No Latch-Up
Short Circuit Protection

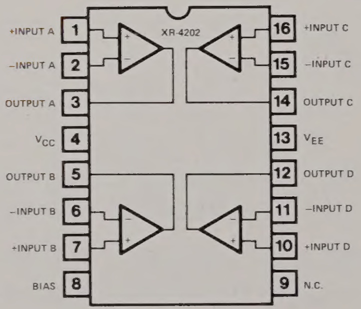
XR-4558



DUAL OPERATIONAL AMPLIFIER

Direct Replacement for RC4558
Improved Performance Replacement for MC1458
Inexpensive 8-Pin Package
Internal Frequency Compensation

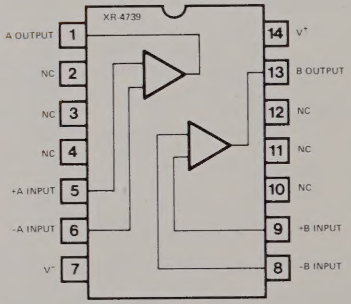
XR-4202



PROGRAMMABLE QUAD OPERATIONAL AMPLIFIER

Programmable
Micropower Operation
Internal Frequency Compensation
No Latch-Up
Short Circuit Protection

XR-4739

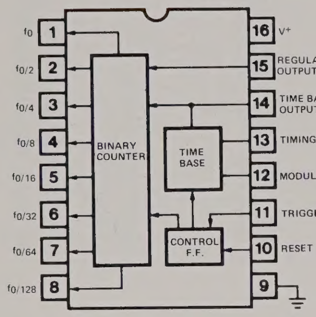


DUAL LOW-NOISE OPERATIONAL AMPLIFIER

Direct Replacement for RC4739
Channel Separation – 125 dB
3 MHz Unity Gain Bandwidth
Internally Compensated Replacement for μA739 and MC1303
Ideal for Audio Work

TIMING CIRCUITS

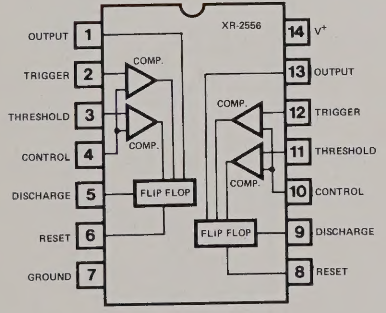
XR-2240



PROGRAMMABLE TIMING CIRCUIT

Time Delay (T = RC) is Programmable From 1RC to 255RC
Supply Voltage: 4.5V to 15V
Long Delays With Small Capacitors
TTL Compatible Outputs
Generates Random Pulse Trains
1000 Hour Delay Possible With Two XR-2240's

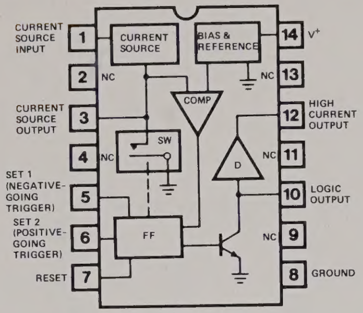
XR-2556



DUAL 555 TIMING CIRCUITS

Replaces Two 555-Type Timers
Timing From μsec to Hours
TTL Compatible Outputs
Temperature Drift Matching Between Timer Sections
Independent Operation of Timer Sections
One-Shot and Self-triggering Operation
Sequential Timing

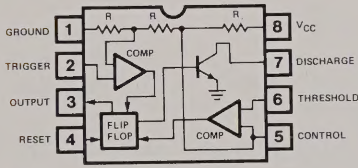
XR-320



TIMING CIRCUIT

Timing From μsec to Hours
Power Supply: 4.5 to 20 Volts
Triggers On Negative or Positive Signals
One-Shot and Self-Triggering Operation
Two Independent Logic Outputs
Time Delay = 2RC
100 mA Current Drive Output

XR-555



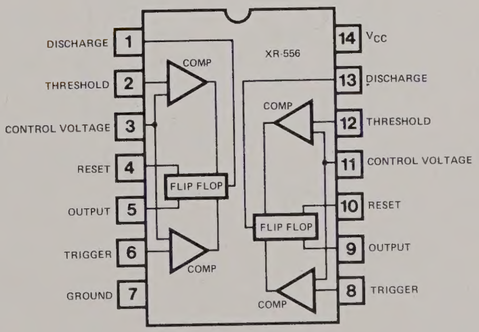
TIMING CIRCUIT

The XR-555 monolithic timing circuit is a highly stable controller capable of producing accurate timing pulses. It is a direct, pin-for-pin replacement for the SE/NE 555 timer.

FEATURES

Direct Replacement for SE/NE 555
Timing from Microseconds Thru Hours
Operates in Both Monostable and Astable Modes
High Current Drive Capability (200 mA)
TTL and DTL Compatible Oututs
Adjustable Duty Cycle
Temperature Stability of 50 ppm/°C

XR-556

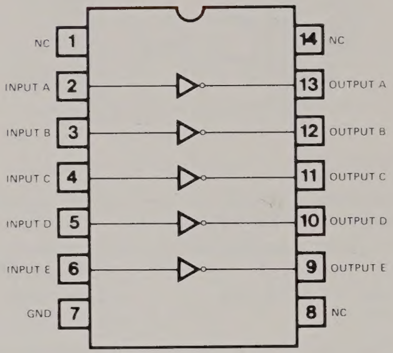


DUAL 555 TIMING CIRCUITS

Replaces Two 555-Type Timers
Timing From μsec to Hours
TTL Compatible Outputs
Temperature Drift Matching Between Timer Sections
Independent Operation of Timer Sections
One-Shot and Self-Triggering Operation
Sequential Timing

INTERFACE CIRCUITS

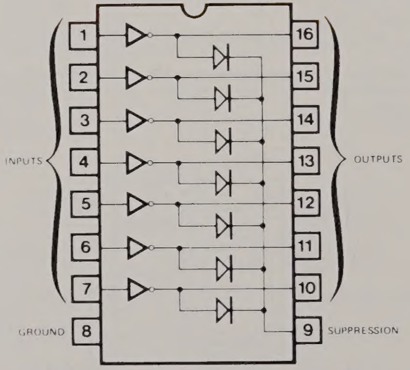
XR-2200



HAMMER DRIVER

High Current Sinking (400 mA/Driver)
MOS Compatible Inputs
Drivers May Be Parallelled for Higher Current
Low Cost

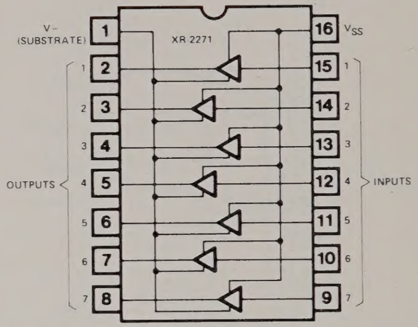
XR-2201/2202/2203/2204



HIGH VOLTAGE, HIGH CURRENT DARLINGTON TRANSISTOR ARRAYS

Compatible with All Logic Families
500 mA/Driver Continuous Current Capacity
Internal Protection for Driving Inductive Loads
Direct Replacement for Sprague ULN 2001A/2002A/2003A/2004A

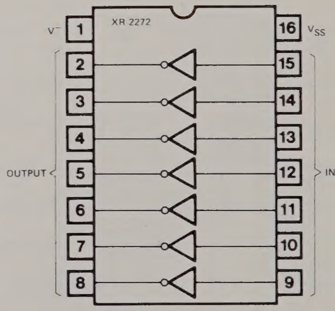
XR-2271



FLUORESCENT DISPLAY DRIVER

Seven drivers in 16 pin DIP
Active high logic
Low input current
Complete input-output isolation
Output pull up resistors on chip
No external parts required to drive
Suited for fluorescent displays

XR-2272

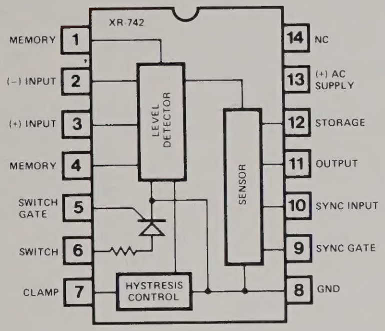


HIGH VOLTAGE 7-DIGIT DISPLAY DRIVER

Active Low Inputs
Versatile Circuits for a Wide Range of Display Applications
High Breakdown Voltages
Low Power Dissipation
16 Pin Dual-In-Line Plastic Package

OTHER CIRCUITS

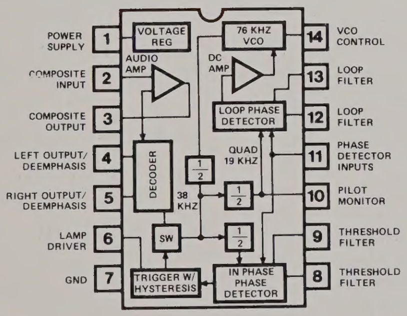
XR-742



ZERO CROSSING AC TRIGGER – TRIGAC

Designed for 60 Hz and 400 Hz AC power control systems
Operates directly from ac line or from a dc supply
Input compatible with wide range of sensor impedances
Bridge sensing with adjustable hysteresis set points
Provides zero crossing thyristor triggering for minimum RFI
Direct replacement for F742

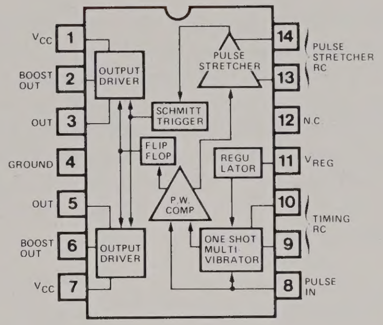
XR-1310



FM STEREO DEMODULATOR

Derives the Right and Left Audio Channels From the Composite Signal
Requires No Inductors
Requires One Potentiometer For Alignment
100 mA Lamp Drive Capability
10 to 24 Volt Supplies
600 mVrms Maximum Composite Input Signal

XR-2264



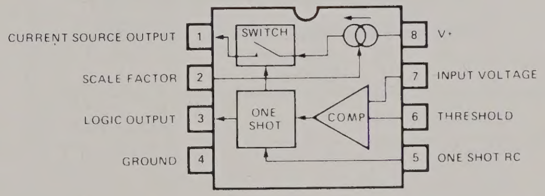
PROPORTIONAL SERVO IC

Wide Supply Voltage Range (3.0V to 6.0V)
Bi-directional Operation with Single Supply
Separately-Adjustable Dead Band and Pulse Stretching
350 mA Drive Current Capability
Self-Contained Driver Transistors to Directly Interface with Servo Motor

APPLICATIONS:
Tape Head Positioner
Floppy Disc Readers
Model Radio Control Servo

Other Versions Available – Consult Factory

XR-4151



VOLTAGE-TO-FREQUENCY CONVERTER

Good Temperature (±100 ppm/°C Typ.)
High Noise Rejection
Low Cost
Direct Replacement for RC/RV/RM4151

CUSTOM CIRCUITS

I^{2}L EXAR-CHIP

With the XR-400K I^{2}L Design Kit, Exar now offers a unique method of manufacturing an almost unlimited variety of custom *linear* and *digital* circuits using I^{2}L technology with greatly reduced cost and development time. Exar makes this possible by stocking I^{2}L silicon wafers that are completely built except for the final process step of device interconnection. These pre-fabricated wafers are then customized by application of *two* additional "masking" steps, one to open the contact windows on the chip, and one to form the desired metal interconnection pattern.

WHAT IS THE EXAR I^{2}L DESIGN KIT?

Exar's XR-400K I^{2}L Design Kit is made up of 30 monolithic I^{2}L logic blocks and bipolar transistor arrays. These monolithic IC's or "kit parts" comprise the basic building blocks for complex analog or digital LSI systems. The XR-400K I^{2}L Design Kit also contains a comprehensive "Design and Applications Manual" which enables the kit user to breadboard his system with I^{2}L logic, and develop his own custom LSI circuit.

XR-400 I^{2}L MASTER CHIP BASIC LAYOUT

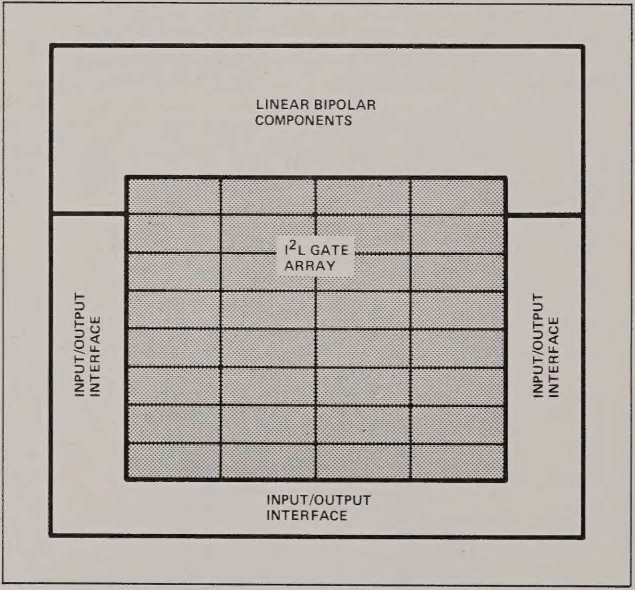


TABLE OF COMPONENTS ON XR-400 I^{2}L MASTER CHIP

COMPONENT TYPE	QUANTITY
Quad Output I^{2}L Gates	256
High-Freq. I^{2}L Gates	16
Input/Output Buffers	23
Bipolar Transistors	103
Resistors	120
Under-passes	210
Bonding Pads	40
Chip Size	110 x 110 mils

EXAR-CHIP

With the "XR-Chip" Integrated Circuit Design Kit, Exar now offers a unique method of manufacturing an almost unlimited variety of custom linear and digital integrated circuits with greatly reduced cost and development time. Exar makes this possible by stocking wafers that are completely built except for the final process step of device interconnection which "metallizes" all selected components together in the required circuit configuration.

The XR-Chip Design Kit enables an engineer to design a metal mask based on his circuit which will interconnect "uncommitted" components on the pre-fabricated wafers (each wafer contains hundreds of chips) in stock. The Kit contains simple instructions and guidelines for designing the metal mask as well as actual breadboard components from the popular A100, B100 and C100 "Chips".

The XR-Chip offers advantages for large volume complete custom programs as well as making custom ICs economically feasible for even small one-time requirements. In conjunction with a complete custom program, XR-Chip custom circuits can be provided at low cost and quick turnaround to fill immediate prototype and/or production requirements while the custom program is under development. It takes only four weeks from layout to packaged ICs—compared to at least six months for a complete custom IC.

With enough components to accommodate your circuit, you may design your own custom chip with the Exar IC Design Kit and obtain the advantages of a custom IC at a price probably less than your present discrete approach.

Furthermore, if your complete custom program is developed at Exar, experience we gain from the XR-Chip development is directly applicable to the complete custom development. Exar is the only company that can offer both services since we have all the manufacturing and engineering facilities required.

Contact your local representative or Exar for additional information.

TABLE OF COMPONENTS ON XR-CHIPS

COMPONENT TYPE	A-100	B-100	C-100
Small NPN Transistors	58	53	46
Small NPN Transistors/Common Collector			8
Small NPN Transistor w/Schottky Diodes	15	16	3
100 mA NPN Transistors			2
200 mA NPN Transistors	2		
Lateral PNP Transistors	18	12	8
Vertical PNP			2
Resistors 50 Ohms			4
Resistors 100 Ohms			4
Resistors 150 Ohms			10
Resistors 200 Ohms	16	27	10
Resistors 400 Ohms			30
Resistors 450 Ohms	43	44	
Resistors 800 Ohms			29
Resistors 900 Ohms	43	46	
Resistors 1.6K Ohms			20
Resistors 1.8K	29	39	
Resistors 3.2K Ohms	29		15
Resistors 3.6K	28	39	
Resistors 5K			4
Resistors 30K Ohms Pinch	4	6	5
Resistors 100K Ohms Pinch	4	6	1
Maximum Number of Bonding Pads	16	24	19
+V Contacts	7	12	10
–V Contacts	8	14	13
Component Total	260	288	201
Chip Size (Mils)	83x73	85x85	76x78

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